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## GENERAL INSTALLATION MANUAL FOR EGING PV MODULES

PLEASE READ THIS MANUAL CAREFULLY BEFORE INSTALLING OR USING THE MODULES.  
PLEASE PASS ALONG THE ATTACHED USER MANUAL TO YOUR CUSTOMER.

### **1. INTRODUCTION**

This Installation Manual contains essential information for the electrical and mechanical installation that you must know before installing EGING PV modules. This also contains safety information you need to be familiar with. All the information described in this manual are the intellectual property of EGING and based on the technologies and experiences that have been acquired and accumulated in the history of EGING. This document does not constitute a warranty, expressed or implied. EGING does not assume responsibility and expressly disclaims liability for loss, damage, or expense arising out of or in any way connected with installation, operation, use or maintenance of the PV modules. No responsibility is assumed by EGING for any infringement of patents or other rights of third parties that may result from use of PV module. EGING reserves the right to make changes to the product, specifications or installation manual without prior notice.

### **2. GENERAL INFORMATION (INCLUDING WARNING AND SAFETY)**

The installation of PV modules requires a great degree of skill and should only be performed by a qualified licensed professional, including licensed contractors and licensed electricians. Please be aware that there is a serious risk of various types of injury occurring during the installation including the risk of electric shock. All EGING PV modules are equipped with a permanently attached junction terminal box that will accept variety of wiring applications or with a special cable assembly for ease of installation, and they do not require special assembly.

#### **< GENERAL WARNING >**

1. PV modules are heavy. Handle with care. Do not drop PV modules far above ground.
2. Before you attempt to install, wire, operate and maintain the PV module, please make sure that you completely understand the information described in this installation manual.
3. Contact with electrically active parts of a PV module such as terminals can result in burns, sparks and lethal shock whether the PV modules is connected or not.
4. PV modules produce electricity when the sunlight or other sources illuminate the module surface. When the modules are connected in series, voltage is cumulative. When the modules are connected in parallel, current is cumulative.

As a result, a large-scale PV system can produce high voltage and current which could present an increased hazard and may cause serious injury or death.

5. Do not connect the PV modules directly to the loads since the variation of the output power depending on the solar irradiation causes damage for the connected load.

#### **< GENERAL SAFETY >**

1. Consult local codes and other applicable laws concerning required permits on regulations concerning installation and inspection requirements.
2. Before installing a PV module, contact appropriate authorities to determine permit, installation and inspection requirements that should be followed.
3. Install PV modules and ground frames in accordance with applicable rules and regulations.
4. PV modules should be installed and maintained by qualified personnel. Only installer/servicer personnel should have access to the PV module installation site.
5. No matter where the PV modules are installed, either roof mounted construction or any other type of structures above the ground, appropriate safety practices should be followed and required safety equipment should be used in order to avoid possible safety hazards. Note that the installation of some PV modules on roofs may require the addition of fireproofing, depending on local building/fire codes.

6. In the case that the PV modules are non-integral type, the module is to be mounted over a fire resistant roof.
7. Follow all safety precautions of other components used in the system.
8. In order to avoid a risk of injury or electrical shock, do not allow anyone to approach the PV module if the person has little knowledge on PV module or on the measures that should be taken when PV modules are damaged.
9. Do not shade portions of the PV module surface from the sunlight for a long time. The shaded cell may become hot (hot spot phenomenon) which results in solder joints peeling off.
10. Do not clean the glass surface with chemicals. Do not let water stay on the glass surface of PV modules for a long time. This creates a risk of white efflorescence (glass disease) which may result in the deterioration of energy generation.
11. Do not install the PV module horizontally. It may cause dirt or white efflorescence (glass disease) due to water.
12. Do not cover the water drain holes of the frame. There is a risk of frost damage when the frame is filled with water cumulation.
13. When sliding snow load has to be considered, an appropriate measure has to be taken so that PV module frames on lower edge of PV modules will not be damaged.
14. Do not expose PV module to sunlight concentrated with mirrors, lenses or similar means.
15. Turn off inverters and circuit breakers immediately, should a problem occur.
16. In case the glass surface of a PV module is broken, wear goggles and tape the glass to keep the broken pieces in place.
17. A defective PV module may generate power even if it is removed from the system. It may be dangerous to handle the PV module while exposed to sunlight. Place a defective PV module in a carton so PV cells are completely shaded.
18. In case of series connection, the maximum open circuit voltage must not be greater than the specified maximum system voltage. The voltage is proportional to the number of series. In case of parallel connection, please be sure to take proper measure (e.g. fuse for protection of module and cable from over current, and/or blocking diode for prevention of unbalanced strings voltage) to block the reverse current flow. The current may easily flow in a reverse direction.

#### < HANDLING SAFETY >

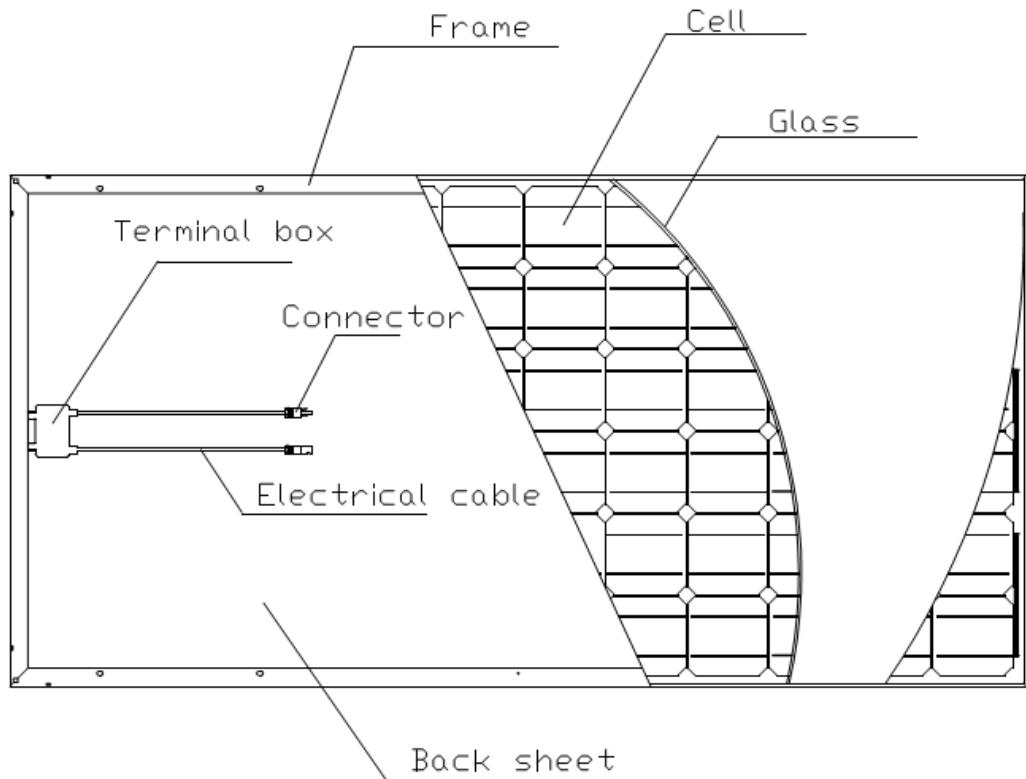
1. Do not cause an excessive load on the surface of PV module or twist the frame. The glass surface can easily break.
2. Do not stand or step on the PV module. The surface glass of PV module is slippery.
3. Do not hit or put excessive load on the glass or back sheet. The PV cell is very thin and can be easily broken.
4. Do not scratch or hit at the back sheet. The back sheet is vulnerable.
5. Do not hit on the terminal box or do not pull the cables. The terminal box can crack and break.
6. Never touch terminal box or the end of output cables with bare hands when the PV module is irradiated. Cover the surface of PV module with cloth or other suitable sufficiently opaque material to isolate the PV module from incident light and handle the wires with rubber-gloved hands to avoid electric shock.
7. Do not scratch the output cable or bend it with force. The insulation of output cable can break and may result in electricity leakage or shock.
8. Do not pull the output cable excessively. The output cable may unplug and cause electricity leakage or shock.
9. Do not drill holes in the frame. It may compromise the frame strength and cause corrosion of the frame.
10. Do not scratch the insulation coating of the frame (except for grounding connection). It may cause corrosion of the frame or compromise the framework strength.
11. Do not touch the PV module with bare hands. The frame of PV module has sharp edges and may cause injury.
12. Do not drop PV module or allow objects to fall down on the PV module.
13. Do not try artificially to concentrate sunlight on the PV module.
14. Do not grab the PV module at only one side. The frame may bend. Grab the PV module at two sides facing each other.

#### < INSTALLATION SAFETY >

1. Always wear protective head gear, insulating gloves and safety shoes (with rubber soles).
2. Keep the PV module packed in the carton until installation.
3. Do not touch the PV module unnecessarily during installation. The glass surface and the frames get hot. There is a risk of burn, or you may collapse because of electric shock.

4. Do not work under rain, snow or windy conditions.
5. Use insulated tools.
6. Do not use wet tools.
7. Do not drop tools or hard objects on PV modules
8. When installing PV modules far above ground, do not drop any object (e.g., PV module or tools).
9. Make sure flammable gases are not generated near the installation site.
10. Completely cover the PV module surface with an opaque material during PV module installation and wiring.
11. Plug in the connector tight and ensure the wiring work.
12. Due to the risk of electrical shock, do not perform any work if the terminals of PV module are wet.
13. Do not touch the terminal box and the end of output cables the cable ends (connectors) with bare hands during installation or under sunlight, regardless of whether the PV module is connected to or disconnected from the system.
14. Do not unplug the connector if the system circuit is connected to a load.
15. Do not stomp on the glass at work. There is a risk of injury or electric shock if glass is broken.
16. Do not work alone (always work as a team of 2 or more people).
17. Wear a safety belt if working far above the ground.
18. Do not wear metallic jewelry which can cause electric shock during installation.
19. Do not damage the back sheet of PV modules when fastening the PV modules to a support by bolts.
20. Do not damage the surrounding PV modules or mounting structure when replacing a PV module.
21. Bind cables by the insulation locks. Drooping down of cables from the terminal box could possibly cause various problems such as animal biting, electricity leakage in puddle.
22. Take proper measures for preventing the laminate (consisted of resin, cells, glass, back sheet, etc.) from dropping out of the frame in case the glass is broken.
23. Cables shall be located so that they will not be exposed to direct sunlight after installation to prevent degradation of cables.

### 3. COMPONENTS



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## 4. SITE SELECTION

In most applications, the PV modules should be installed in a location where there is no shading throughout the year. In the Northern Hemisphere, the PV modules should typically face south, and in the Southern Hemisphere, the PV modules should typically face north.

Please make sure that there are no obstructions in the surroundings of the site of installation. Take proper steps in order to maintain reliability and safety, in case the PV modules are used in areas such as: Heavy snow areas / Extremely cold areas / Strong wind areas / Installations over, or near, water / Areas where installations are prone to salt water damage / Small islands or desert areas.

If you are planning to use the PV modules where the salt water damage may be possible, please consult with EGING local agent first to determine an appropriate installation method, or to determine whether the installation is possible.

## 5. TILT ANGLE

The tilt angle of the PV module is the measured between the PV module and a horizontal ground surface.

The PV module generates the maximum output power when it faces the sun directly.

For the standalone systems with a battery where the PV modules are attached to a permanent structure, the tilt angle of the PV modules should be determined to optimize the performance when the sunlight is the scarcest. In general, if the electric power generation is adequate when the sunlight is the scarcest, then the angle chosen should be adequate during the rest of the year. For grid-connected installations where the PV modules are attached to a permanent structure, it is recommended to tilt the PV module at the angle equal to the latitude of the installation site so that the power generation from the PV module will be optimum throughout the year.

## 6. WIRING

To ensure proper system operation and to maintain your warranty, observe the correct cable connection polarity (Figures 1 & 2) when connecting the modules to a battery or to other modules. If not connected correctly, the bypass diode could be destroyed.

PV modules can be wired in series to increase voltage. Connect wires from the positive terminal of one module to the negative terminal of the next module. Figure 1 shows modules connected in series.

Connect PV modules in parallel to increase current. Connect wires from the positive terminal of one module to the positive terminal on the next module. Figure 2 shows modules connected.

Figure 1. SERIES for more voltage

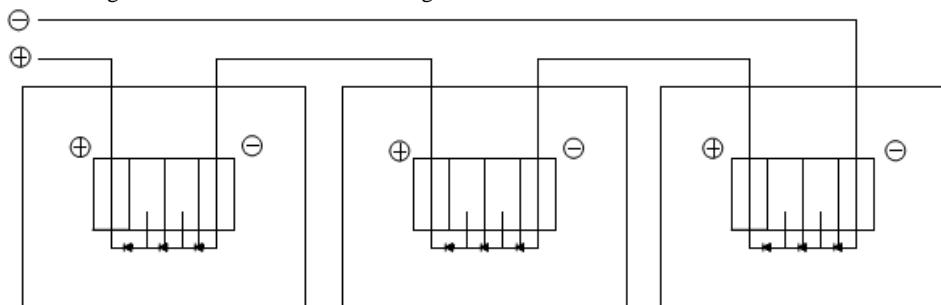
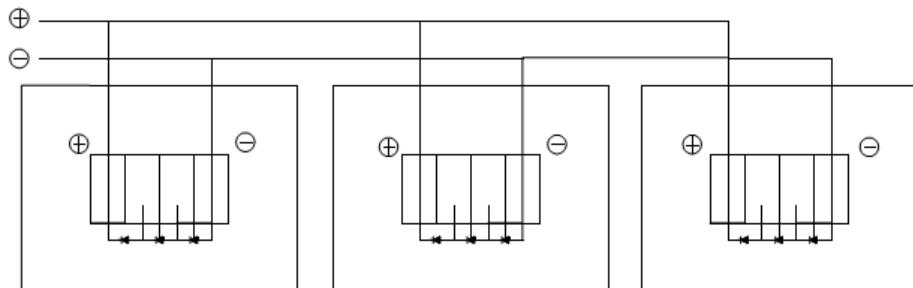


Figure 2. PARALLEL for more current



## 7. INSTALLATION

Refer to installation manual of individual models of PV module.

## 8. ELECTRICAL RATINGS

Refer to installation manual of individual models of PV module.

## 9. GROUNDING

The frame grounding is considered within the requirement of local and regulation at the site of installation. When needed this grounding, please refer to below example of connection. Please be careful in arranging the system ground so that the removal of one module from the circuit will not interrupt the grounding of any other modules.

The modules should be grounded to the same electrical point as described below.

Each PV module has a hole on each long side frame for either a screw, nut and washer grounding the module to the frame, a ground screw fastened by screw or bolt, or appropriate screw (hardware not provided). An example of acceptable ground connection using a screw, nut and washer retaining a ground screw is shown in figure 3. In a connection of this type, the hardware (such as a toothed locked washer / star washer) must score the frame surface to make positive electrical contact with the frame. The ground wire must be considered within the requirement of local and regulation at the site of installation.

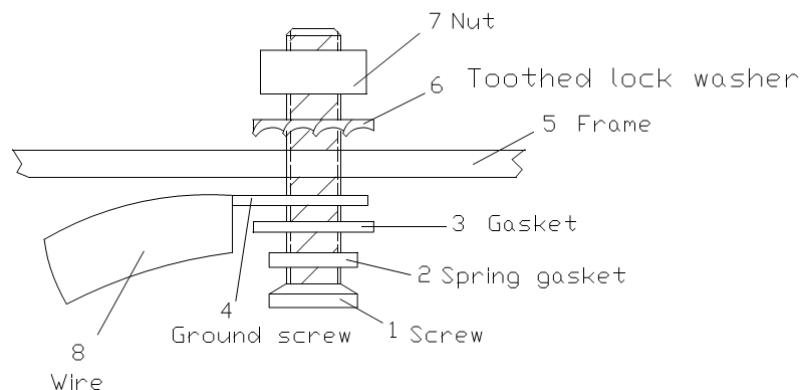


Figure 3. Example of acceptable ground connection



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## 10. MOUNTING

Please make sure that all the information described in the installation manual is still valid and proper for your installation. The mounting method has been verified by EGING and NOT CERTIFIED by a third party organization.

The approved way to mount EGING PV modules to a support structure is using the bolt holes provided as described in the Specifications. Although EGING does not specify or warrant frame clips or clamps, using frame clips (not provided) or clamps (not provided) is also possible when they are designed for PV modules and with minimum dimensions on the sides of the module in accordance with the instructions and drawings provided. If using frame clips or clamps, the modules should be fixed rigidly and there shall be no damage to the modules by deforming mounting structure against design load. EGING does not specify or warrant frame clips. The EGING module warranty may be void if customer-selected frame clips which are improper or inadequate with respect to the module properties (including strength or material) or installation. Note that if metal clips are used, there must be a path to ground from the clips, (for instance, using star washers in the clip hardware set).

Please review the descriptions and drawings carefully; not mounting the modules according to one of these methods may void your warranty. These mounting methods are designed to allow module loading of 5400Pa. Support structures that PV modules are mounted on should be rigid. EGING PV modules are designed to secure their electric performance under the condition that they are mounted on rigid support structures. Deformation of support structure may damage PV module with its electric performance.

## 11. MAINTENANCE

The modules are designed for long life and require very little maintenance. If the angle of the PV module is 5 degrees or more, normal rainfall is sufficient to keep the module glass surface clean under most weather conditions. If dirt build-up becomes excessive, clean the glass surface only with a soft cloth using water. If cleaning the back of the module is required, take utmost care not to damage the back side materials. In order to ensure the operation of the system, please check the connection of wiring and the state of the jacket of wires every now and then.

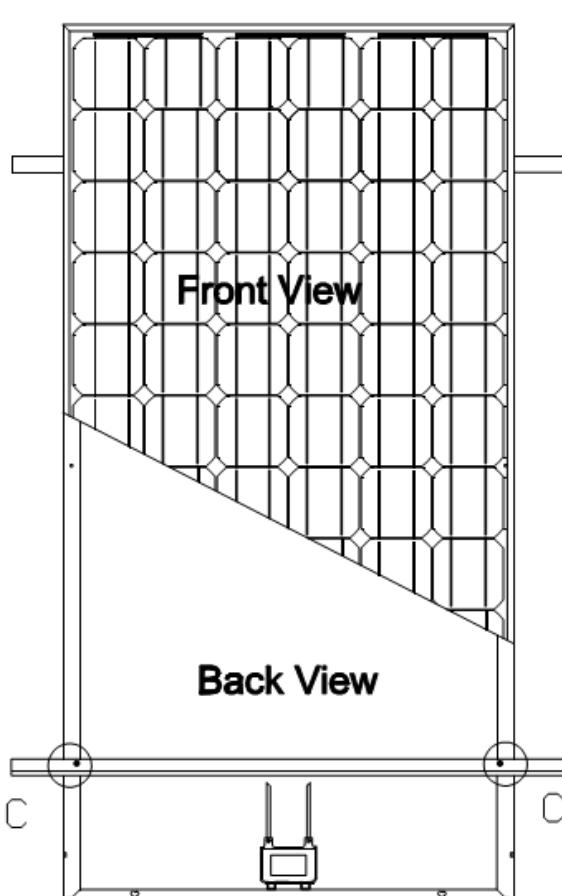
## INSTALLATION MANUAL - PHOTOVOLTAIC MODULES- EG-180SM

### 1. INSTALLATION

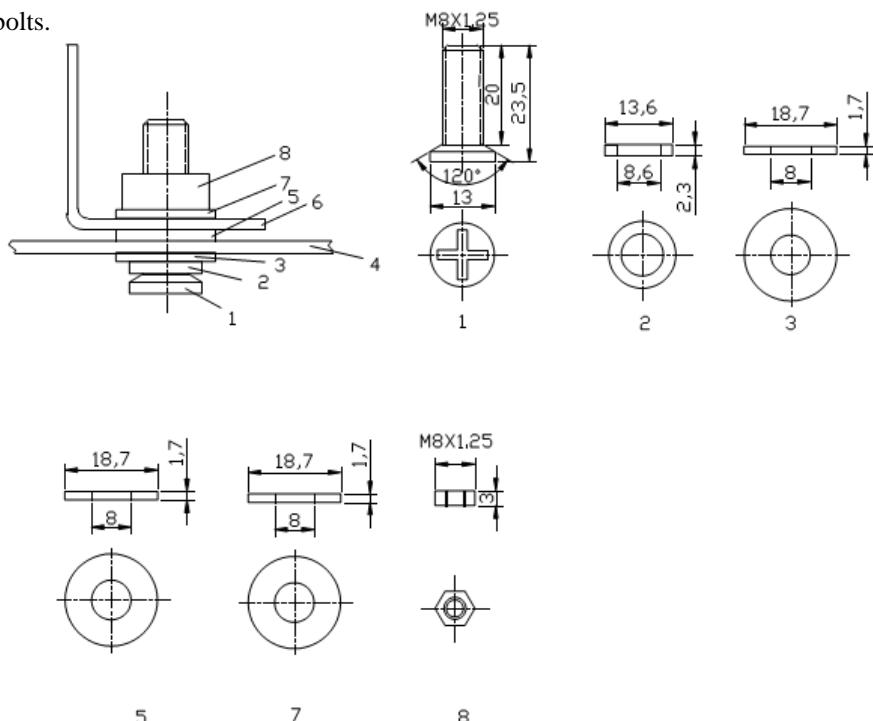
The mounting method has been verified by EGING and NOT CERTIFIED by a third party organization. Please review the descriptions and drawings carefully; not mounting the modules according to one of these methods may void your warranty. These mounting methods are designed to allow module loading of 5400Pa.

#### Mounting Using Frame Bolt Holes (Figures 1 , 2 & 3)

The modules may be fastened to a support using the bolt holes in the bottom of the frame at location “C”, as shown in Figure 1 (back view of the module) , Figure 2 (mounting detail) and Figure 3 (parts detail). The module should be fastened with four (4) M8 bolts.



**Figures 1**



**Note: Installation Order 1 to 8**

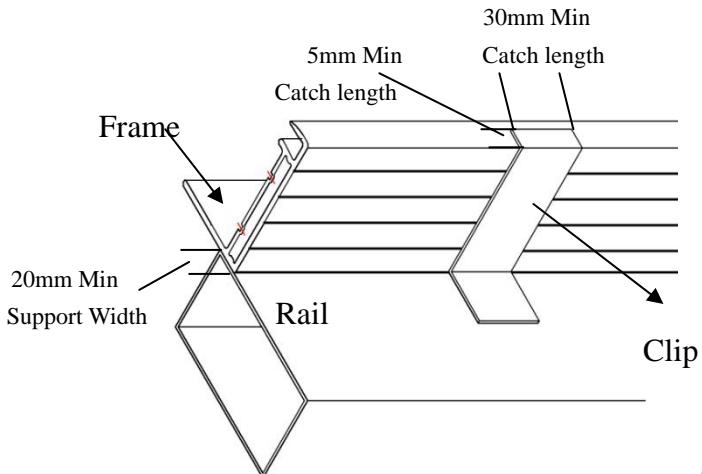
**Figures 2**

8	Nut	M8X1.25
7	Gasket	18.7X1.7
6	Mount	5X40
5	Gasket	18.7X1.7
4	Frame of the module	1580X808X50/45
3	Gasket	18.7X1.7
2	Spring gasket	13.6X2.3
1	Screw	M8X1.25
NO.	NAME	standard

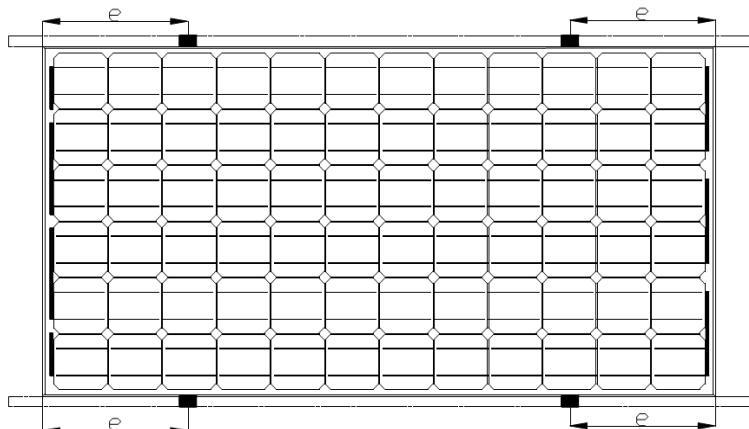
**Figures 3**

## **Mounting Using Clips on Long Edge of Module: Long Edge Parallel to Array Rails (Figure 5)**

The modules may be mounted using clips (clamps) designed for solar modules as shown in Figures 4 and 5. Note that the clip positions are important – the clip centerlines must be between 140mm and 450mm from the end of the module. The module must be supported along the length of the long edge, and should overlap the array rail by at least 20mm. Note that the mounting clips should meet the minimum dimensions (catch width of 5mm and length of 30mm) as shown in Figure 4. We recommend that the array rails shall support the bottom of the modules and shall be continuous pieces (no breaks in the rail) and this may be decided by the installer according to the roof structure.

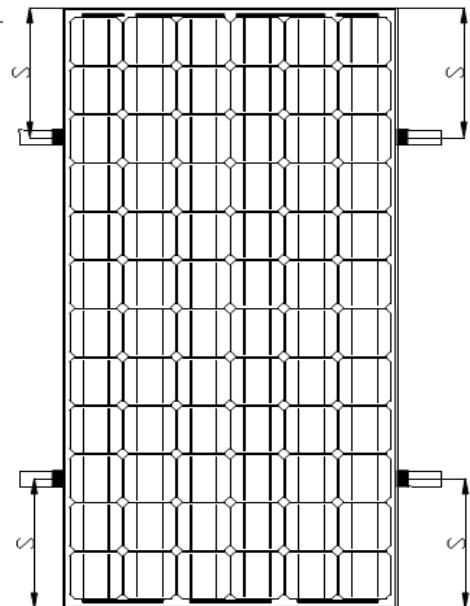


Figures 4



$$140\text{mm} < e < 450\text{mm}$$

Figures 5



$$140\text{mm} < s < 450\text{mm}$$

Figures 6

## **Mounting Using Clips on Long Edge of Module: Long Edge Perpendicular to Array Rails (Figure 6)**

The modules may also be mounted using clips on the long sides of the module when the array rails are perpendicular to the long sides, as shown in Figure 6. The clip centerlines must be between 140mm and 390mm from the ends of the module. Note that the mounting clips should meet the minimum dimensions (catch width of 5mm and length of 30mm) shown in Figure 4. The array rails must support the bottom of the modules and must be continuous pieces (no breaks in the rail).



## 2. ELECTRICAL INSTALLATION INSTRUCTION

### Cable characteristics

Size: 4.0mm<sup>2</sup>

Type: TUV cable

Temperature rating of conductor: -40~120°C

### Module configuration (Recommend)

# Maximum series configuration: please refer to Table 1 (This value is calculated under the condition of Voc at -40°C.)

# Maximum parallel strings without proper measures (e.g. fuse and/or blocking diode): 1 string.

(Note: Parallel configuration is not limited in case of taking proper measure (e.g. fuse for protection of module and cable from over current, and/or blocking diode for prevention of unbalanced strings voltage) to block the reverse current flow.)

## 3. WARNING

**Do not stand or step on the PV module (Glass, Frame, Film and Terminal box).**

## INSTALLATION MANUAL - PHOTOVOLTAIC MODULES-

### ELECTRICAL OUTPUT AND THERMAL CHARACTERISTIC

Rated electrical characteristics are within ±10 percent of the indicated values of Isc, Voc, and ±3 percent of Pmax under STC (standard test conditions) (irradiance of 1000 W/m<sup>2</sup>, AM 1.5 spectrum, and a cell temperature of 25 °C (77°F). The warranty conditions are specified elsewhere in this manual.

Table-1. Electrical characteristics (at STC)

Model Type	Maximum Power (Pmax)	Tolerance	Open Circuit Voltage (Voc)	Short circuit current (Isc)	Maximum Power voltage (Vmp)	Maximum Power Current (Imp)	Maximum system Voltage	Fuse Current	Application Class	Maximum Series Configuration
EGM-145	145W	±3%	43.52V	4.27A	36.26V	4.01A	1000V	10A	A	52.71V
EGM-150	150W	±3%	43.20V	4.95A	34.20V	4.39A	1000V	10A	A	52.33V
EGM-155	155W	±3%	41.56 V	4.9 A	33.58 V	4.62 A	1000V	10 A	A	50.34V
EGM-160	160W	±3%	43.68 V	5.08 A	35.54 V	4.65 A	1000V	10A	A	52.91V
EGM-165	165W	±3%	43.74V	5.23 A	34.47V	4.79 A	1000V	10A	A	52.98V
EGM-170	170W	±3%	43.82 V	5.38 A	34.52 V	4.9 3 A	1000V	10 A	A	53.08V
EGM-175	175W	±3%	43.89 V	5.57 A	34.43 V	5.1 A	1000V	10 A	A	53.16V
EGM-180	180W	±3%	44.3V	5.54A	35.16V	5.12A	1000V	10 A	A	53.66V
EGM-185	185W	±3%	44.38V	5.7A	35.16V	5.27A	1000V	10 A	A	53.76V

Under normal conditions, a photovoltaic module is likely to experience conditions that produce more current and/or voltage than reported at Standard Test Conditions. Accordingly, the values of Isc and Voc marked on this module should be multiplied by a factor of 1.25 when determining component voltage ratings, conductor capacities, fuse sizes and size of controls connected to the module output.

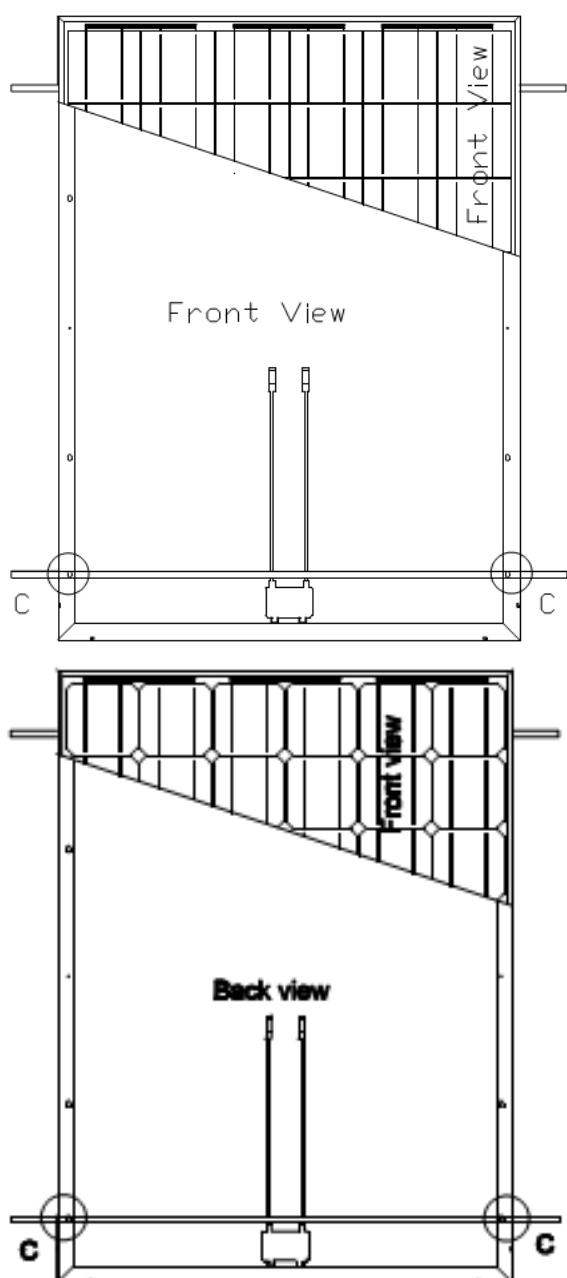
## INSTALLATION MANUAL - PHOTOVOLTAIC MODULES- EG-190SM EG-48SP

### 1. INSTALLATION

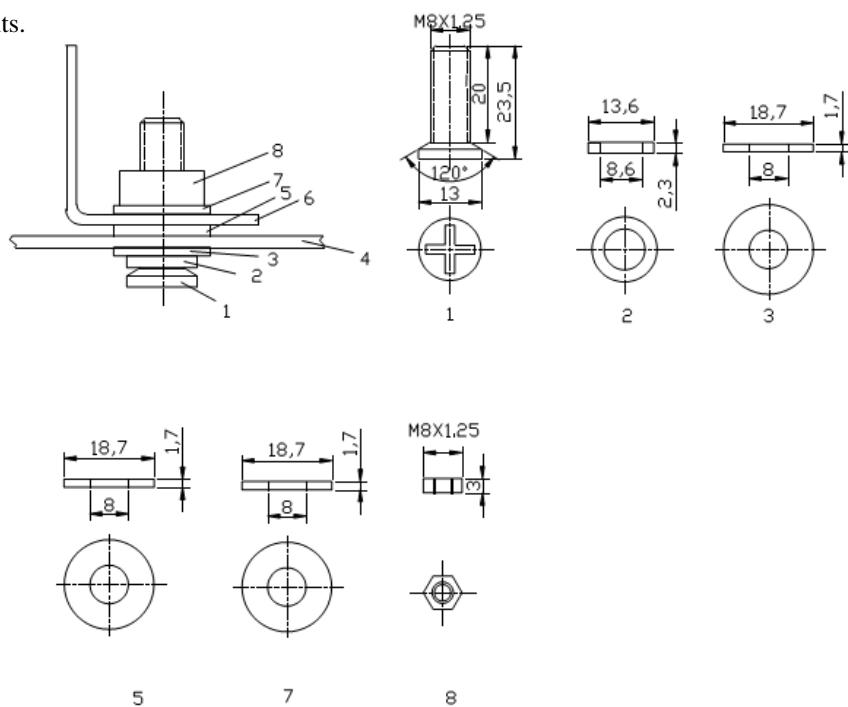
The mounting method has been verified by EGING and NOT CERTIFIED by a third party organization. Please review the descriptions and drawings carefully; not mounting the modules according to one of these methods may void your warranty. These mounting methods are designed to allow module loading of 5400Pa.

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The modules may be fastened to a support using the bolt holes in the bottom of the frame at location "C", as shown in Figure 1 (back view of the module) , Figure 2 (mounting detail) and Figure 3 (parts detail). The module should be fastened with four (4) M8 bolts.



**Figures 1**



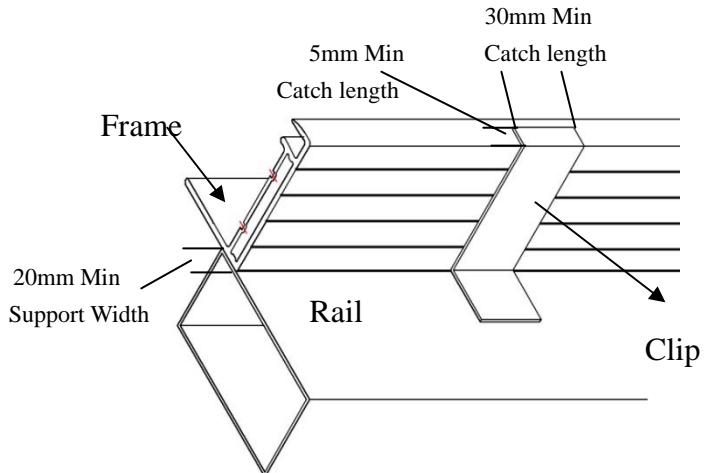
Note: Installation Order 1 to 8  
Figures 2

8	Nut	M8X1.25
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6	Mount	5X40
5	Gasket	18.7X1.7
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2	Spring gasket	13.6X2.3
1	Screw	M8X1.25
NO.	NAME	standard

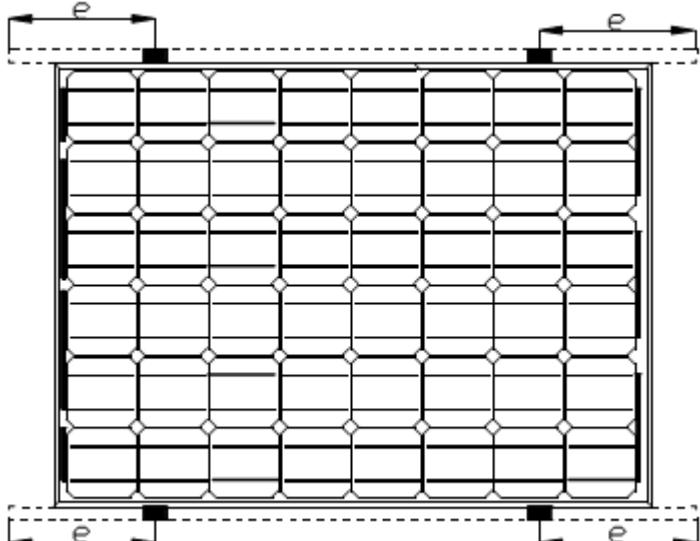
**Figures 3**

## **Mounting Using Clips on Long Edge of Module: Long Edge Parallel to Array Rails (Figure 5)**

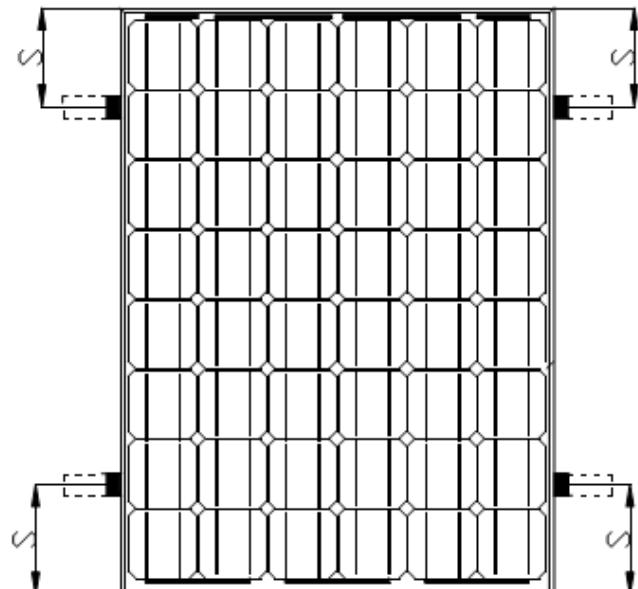
The modules may be mounted using clips (clamps) designed for solar modules as shown in Figures 4 and 5. Note that the clip positions are important – the clip centerlines must be between 140mm and 390mm from the end of the module. The module must be supported along the length of the long edge, and should overlap the array rail by at least 20mm. Note that the mounting clips should meet the minimum dimensions (catch width of 5mm and length of 30mm) as shown in Figure 4. We recommend that the array rails shall support the bottom of the modules and shall be continuous pieces (no breaks in the rail) and this may be decided by the installer according to the roof structure.



Figures 4



Figures 5



Figures 6

## **Mounting Using Clips on Long Edge of Module: Long Edge Perpendicular to Array Rails (Figure 6)**

The modules may also be mounted using clips on the long sides of the module when the array rails are perpendicular to the long sides, as shown in Figure 6. The clip centerlines must be between 140mm and 390mm from the ends of the module. Note that the mounting clips should meet the minimum dimensions (catch width of 5mm and length of 30mm) shown in Figure 4. The array rails must support the bottom of the modules and must be continuous pieces (no breaks in the rail).

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Type: TUV cable

Temperature rating of conductor: -40~120°C

### Module configuration (Recommend)

# Maximum series configuration: please refer to Table 1 (This value is calculated under the condition of Voc at -40°C.)

# Maximum parallel strings without proper measures (e.g. fuse and/or blocking diode): 1 string.

(Note: Parallel configuration is not limited in case of taking proper measure (e.g. fuse for protection of module and cable from over current, and/or blocking diode for prevention of unbalanced strings voltage) to block the reverse current flow.)

### 3. WARNING

**Do not stand or step on the PV module (Glass, Frame, Film and Terminal box).**

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### ELECTRICAL OUTPUT AND THERMAL CHARACTERISTIC

Rated electrical characteristics are within ±10 percent of the indicated values of Isc, Voc, and ±3 percent of Pmax under STC (standard test conditions) (irradiance of 1000 W/m<sup>2</sup>, AM 1.5 spectrum, and a cell temperature of 25 °C (77°F). The warranty conditions are specified elsewhere in this manual.

**Table-1. Electrical characteristics (at STC)**

Model Type	Maximum Power (Pmax)	Tolerance	Open Circuit Voltage (Voc)	Short circuit current (Isc)	Maximum Power voltage (Vmp)	Maximum Power Current (Imp)	Maximum system Voltage	Fuse Current	Application Class	Maximum Series Configuration
EG-150P48-C	150W	±3%	28.8V	7.3A	22.8V	6.5A	1000V	13A	A	34.88V
EG-155P48-C	155W	±3%	28.8V	7.45A	22.8V	6.8A	1000V	13A	A	34.88V
EG-160P48-C	160W	±3%	28.8V	7.65A	22.8V	7.02A	1000V	13A	A	34.88V
EG-165P48-C	165W	±3%	29V	7.8A	23V	7.18A	1000V	13A	A	35.13V
EG-170P48-C	170W	±3%	29V	7.8A	23V	7.4A	1000V	13A	A	35.13V
EG-175P48-C	175W	±3%	29.2V	8.2A	23.2V	7.56A	1000V	13A	A	35.37V.
EG-180P48-C	180W	±3%	29.4V	8.62A	23.4V	7.69A	1000V	13A	A	35.61V
EG-185P48-C	185W	±3%	29.6V	8.8A	23.62V	7.83A	1000V	13A	A	35.85V
EG-155M48-C	155W	±3%	28.8V	7.45A	22.8V	6.8A	1000V	13A	A	34.88V
EG-160M48-C	160W	±3%	28.8V	7.65A	22.8V	7.02A	1000V	13A	A	34.88V
EG-165M48-C	165W	±3%	29V	7.8A	23V	7.18A	1000V	13A	A	35.13V
EG-170M48-C	170W	±3%	29V	7.8A	23V	7.4A	1000V	13A	A	35.13V
EG-175M48-C	175W	±3%	29.2V	8.2A	23.2V	7.56A	1000V	13A	A	35.37V
EG-180M48-C	180W	±3%	29.4V	8.62A	23.4V	7.69A	1000V	13A	A	35.61V
EG-185M48-C	185W	±3%	29.6V	8.8A	23.62V	7.83A	1000V	13A	A	35.85V
EG-190M48-C	190W	±3%	29.6V	8.91A	23.62V	8.04A	1000V	13A	A	35.85V

Under normal conditions, a photovoltaic module is likely to experience conditions that produce more current and/or voltage than reported at Standard Test Conditions. Accordingly, the values of Isc and Voc marked on this module should be multiplied by a factor of 1.25 when determining component voltage ratings, conductor capacities, fuse sizes and size of controls connected to the module output.

## INSTALLATION MANUAL - PHOTOVOLTAIC MODULES-

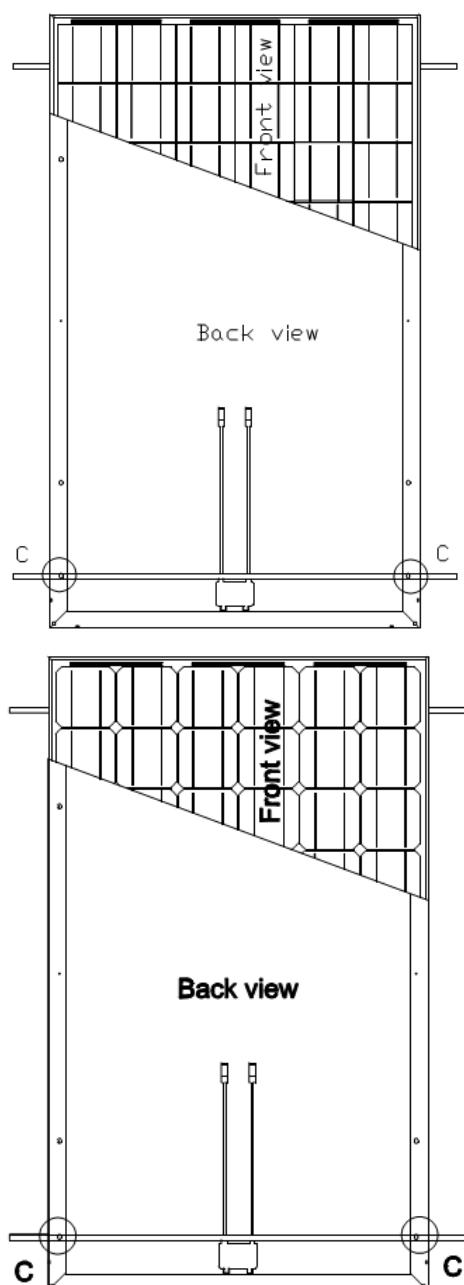
### EG-215SM EG-54SP

#### 1. INSTALLATION

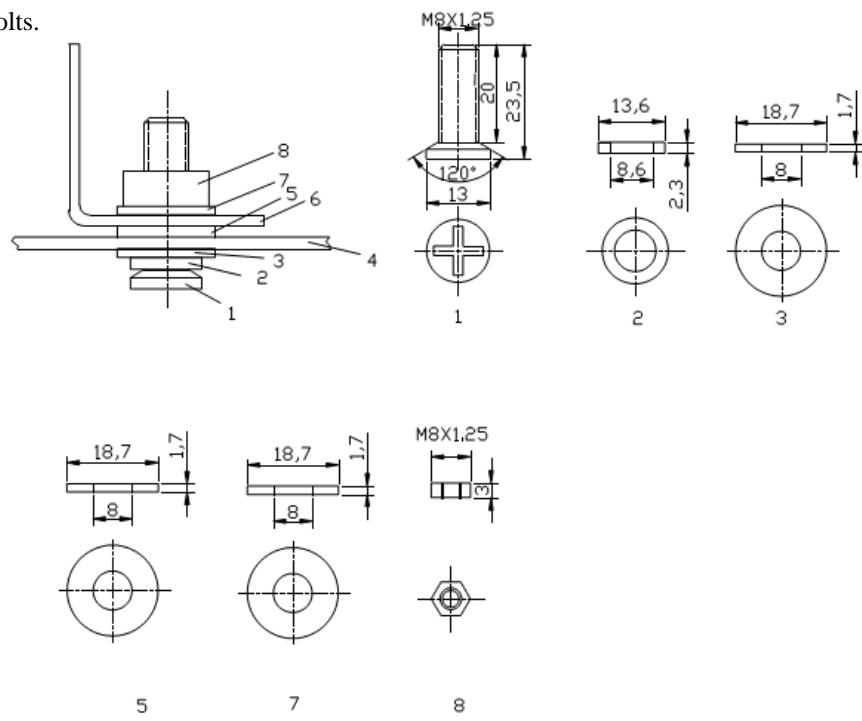
The mounting method has been verified by EGING and NOT CERTIFIED by a third party organization. Please review the descriptions and drawings carefully; not mounting the modules according to one of these methods may void your warranty. These mounting methods are designed to allow module loading of 5400Pa.

#### Mounting Using Frame Bolt Holes (Figures 1 , 2 & 3)

The modules may be fastened to a support using the bolt holes in the bottom of the frame at location “C”, as shown in Figure 1 (back view of the module) , Figure 2 (mounting detail) and Figure 3 (parts detail). The module should be fastened with four (4) M8 bolts.



**Figures 1**



**Note: Installation Order 1 to 8**

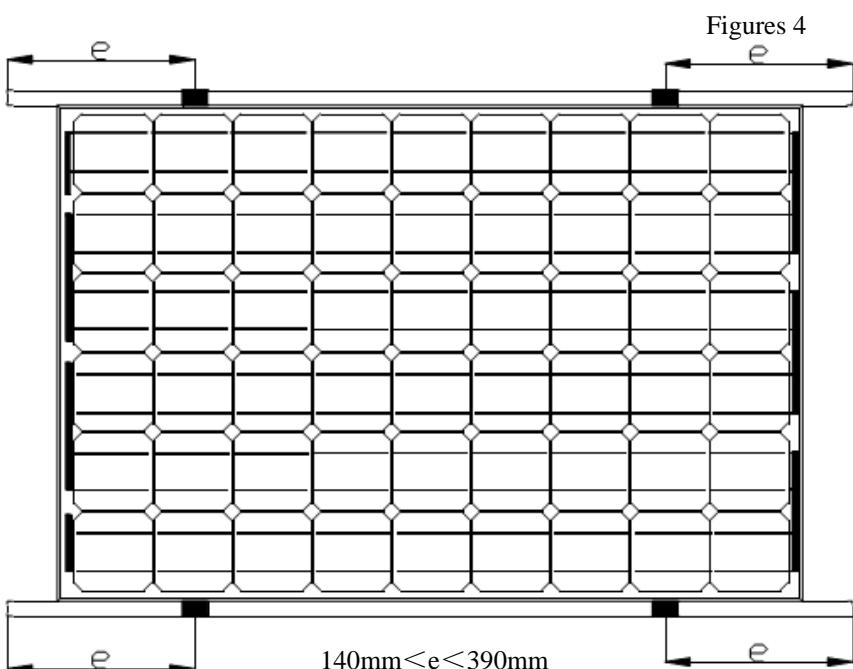
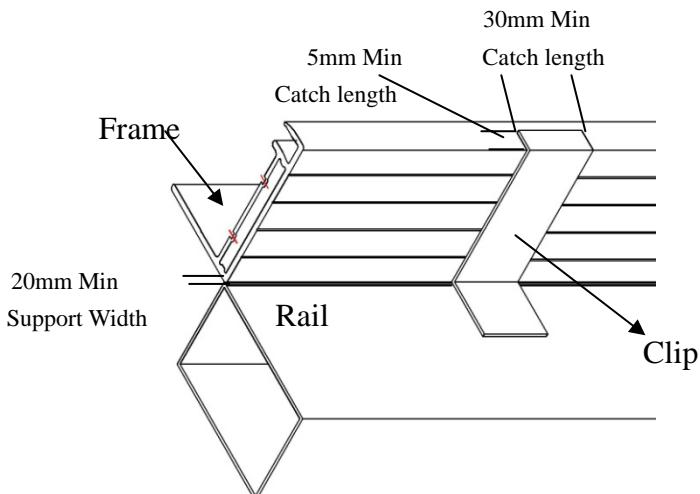
**Figures 2**

8	Nut	M8X1.25
7	Gasket	18.7X1.7
6	Mount	5X40
5	Gasket	18.7X1.7
4	Frame of the module	1490X990X50
3	Gasket	18.7X1.7
2	Spring gasket	13.6X2.3
1	Screw	M8X1.25
No.	NAME	standard

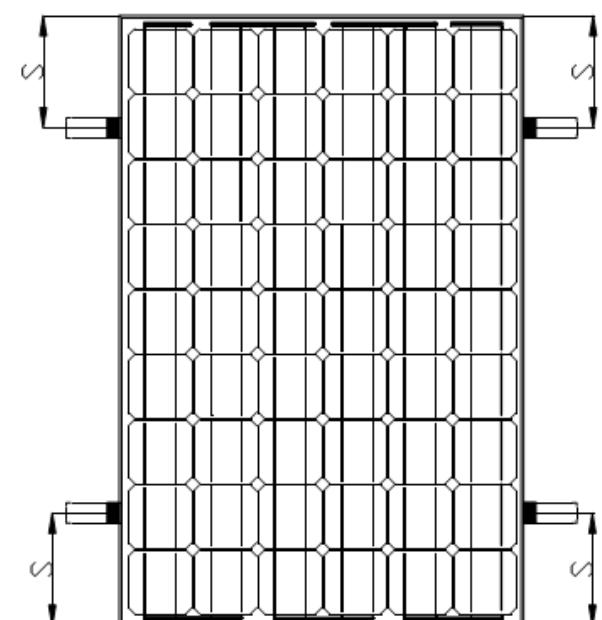
**Figures 3**

## **Mounting Using Clips on Long Edge of Module: Long Edge Parallel to Array Rails (Figure 5)**

The modules may be mounted using clips (clamps) designed for solar modules as shown in Figures 4 and 5. Note that the clip positions are important – the clip centerlines must be between 140mm and 390mm from the end of the module. The module must be supported along the length of the long edge, and should overlap the array rail by at least 20mm. Note that the mounting clips should meet the minimum dimensions (catch width of 5mm and length of 30mm) as shown in Figure 4. We recommend that the array rails shall support the bottom of the modules and shall be continuous pieces (no breaks in the rail) and this may be decided by the installer according to the roof structure.



Figures 5



Figures 6

## **Mounting Using Clips on Long Edge of Module: Long Edge Perpendicular to Array Rails (Figure 6)**

The modules may also be mounted using clips on the long sides of the module when the array rails are perpendicular to the long sides, as shown in Figure 6. The clip centerlines must be between 140mm and 390mm from the ends of the module. Note that the mounting clips should meet the minimum dimensions (catch width of 5mm and length of 30mm) shown in Figure 4. The array rails must support the bottom of the modules and must be continuous pieces (no breaks in the rail).



## 2. ELECTRICAL INSTALLATION INSTRUCTION

### Cable characteristics

Size: 4.0mm<sup>2</sup>

Type: TUV cable

Temperature rating of conductor: -40~120°C

### Module configuration (Recommend)

# Maximum series configuration: please refer to Table 1 (This value is calculated under the condition of Voc at -40°C.)

# Maximum parallel strings without proper measures (e.g. fuse and/or blocking diode): 1 string.

(Note: Parallel configuration is not limited in case of taking proper measure (e.g. fuse for protection of module and cable from over current, and/or blocking diode for prevention of unbalanced strings voltage) to block the reverse current flow.)

## 3. WARNING

**Do not stand or step on the PV module (Glass, Frame, Film and Terminal box).**

## INSTALLATION MANUAL - PHOTOVOLTAIC MODULES-

### ELECTRICAL OUTPUT AND THERMAL CHARACTERISTIC

Rated electrical characteristics are within ±10 percent of the indicated values of Isc, Voc, and ±3 percent of Pmax under STC (standard test conditions) (irradiance of 1000 W/m<sup>2</sup>, AM 1.5 spectrum, and a cell temperature of 25 °C (77°F). The warranty conditions are specified elsewhere in this manual.

Table-1. Electrical characteristics (at STC)

Model Type	Maximum Power (Pmax)	Tolerance	Open Circuit Voltage (Voc)	Short circuit current (Isc)	Maximum Power voltage (Vm)	Maximum Power Current (Imp)	Maximum system Voltage	Fuse Current	Application Class	Maximum Series Configuration
EG-175P54-C	175W	±3%	32.4V	7.6A	25.65V	6.82A	1000V	13A	A	39.24V
EG-180P54-C	180W	±3%	32.4V	7.83A	25.65V	7.02A	1000V	13A	A	39.24V
EG-185P54-C	185W	±3%	32.6V	7.99A	25.87V	7.15A	1000V	13A	A	39.49V
EG-190P54-C	190W	±3%	32.6V	8.2A	25.87V	7.34A	1000V	13A	A	39.49V
EG-195P54-C	195W	±3%	32.8V	8.37A	26.1V	7.47A	1000V	13A	A	39.73V
EG-200P54-C	200W	±3%	32.8V	8.58A	26.1V	7.66A	1000V	13A	A	39.73V
EG-205P54-C	205W	±3%	33.1V	8.73A	26.33V	7.79A	1000V	13A	A	40.09V
EG-210P54-C	210W	±3%	33.3V	8.88A	26.57V	7.9A	1000V	13A	A	40.33V
EG-180M54-C	180W	±3%	32.4V	7.83A	25.65V	7.02A	1000V	13A	A	39.24V
EG-185M54-C	185W	±3%	32.6V	7.99A	25.87V	7.15A	1000V	13A	A	39.49V
EG-190M54-C	190W	±3%	32.6V	8.2A	25.87V	7.34A	1000V	13A	A	39.49V
EG-195M54-C	195W	±3%	32.8V	8.37A	26.1V	7.47A	1000V	13A	A	39.73V
EG-200M54-C	200W	±3%	32.8V	8.58A	26.1V	7.66A	1000V	13A	A	39.73V
EG-205M54-C	205W	±3%	33.1V	8.73A	26.33V	7.79A	1000V	13A	A	40.09V
EG-210M54-C	210W	±3%	33.3V	8.88A	26.57V	7.9A	1000V	13A	A	40.33V
EG-215M54-C	215W	±3%	33.3V	8.96A	26.57V	8.09A	1000V	13A	A	40.33V

Under normal conditions, a photovoltaic module is likely to experience conditions that produce more current and/or voltage than reported at Standard Test Conditions. Accordingly, the values of Isc and Voc marked on this module should be multiplied by a factor of 1.25 when determining component voltage ratings, conductor capacities, fuse sizes and size of controls connected to the module output.

## INSTALLATION MANUAL - PHOTOVOLTAIC MODULES-

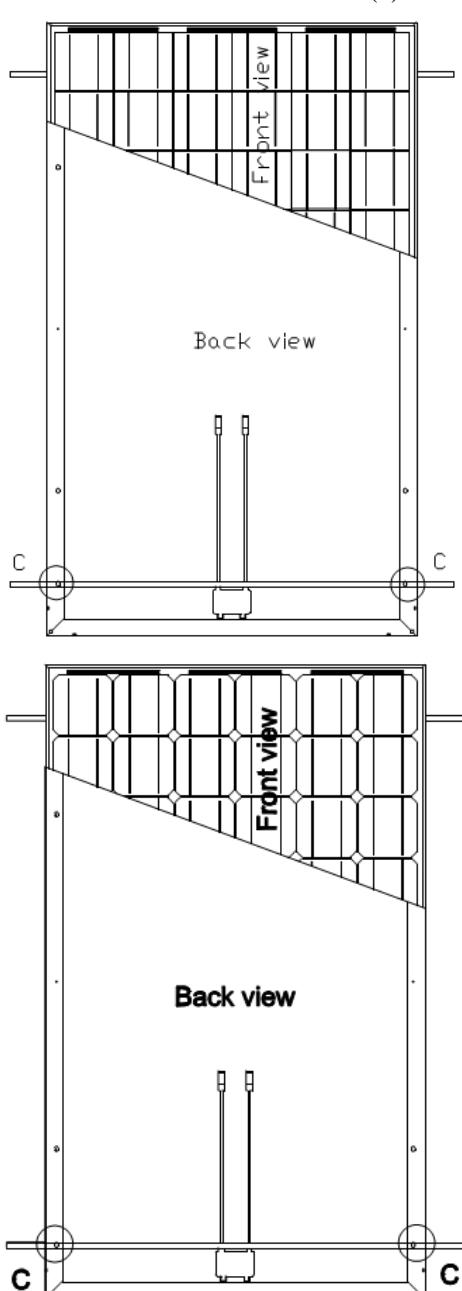
### EG-235SM EG-60SP

#### 1. INSTALLATION

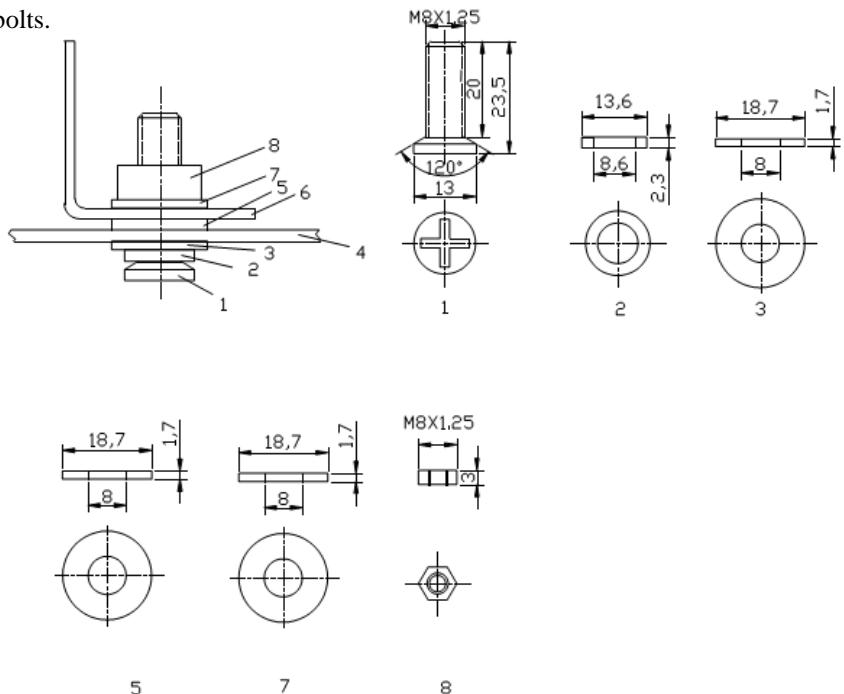
The mounting method has been verified by EGING and NOT CERTIFIED by a third party organization. Please review the descriptions and drawings carefully; not mounting the modules according to one of these methods may void your warranty. These mounting methods are designed to allow module loading of 5400Pa.

#### Mounting Using Frame Bolt Holes (Figures 1 , 2 & 3)

The modules may be fastened to a support using the bolt holes in the bottom of the frame at location "C", as shown in Figure 1 (back view of the module) , Figure 2 (mounting detail) and Figure 3 (parts detail). The module should be fastened with four (4) M8 bolts.



**Figures 1**



**Note: Installation Order 1 to 8**

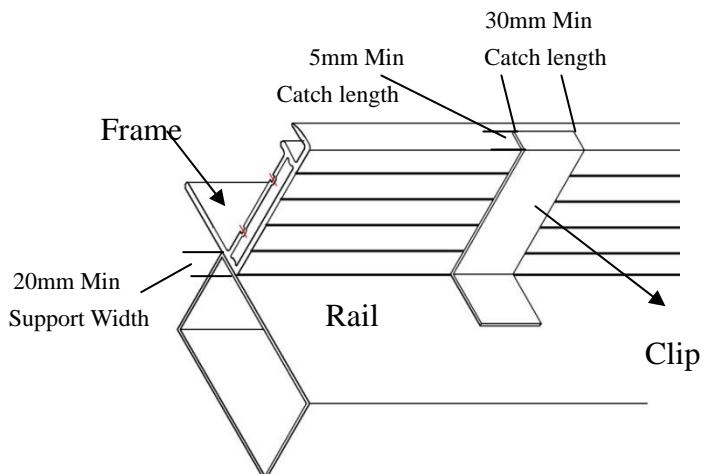
**Figures 2**

8	Nut	M8X1.25
7	Gasket	18.7X1.7
6	Mount	5X40
5	Gasket	18.7X1.7
4	Frame of the module	1650X990X50
3	Gasket	18.7X1.7
2	Spring gasket	13.6X2.3
1	Screw	M8X1.25
No.	NAME	standard

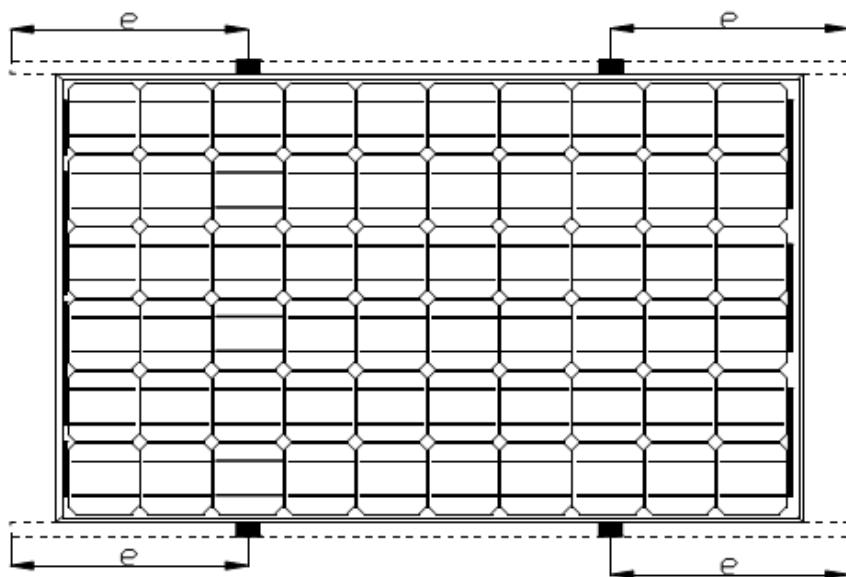
**Figures 3**

## **Mounting Using Clips on Long Edge of Module: Long Edge Parallel to Array Rails (Figure 5)**

The modules may be mounted using clips (clamps) designed for solar modules as shown in Figures 4 and 5. Note that the clip positions are important – the clip centerlines must be between 140mm and 390mm from the end of the module. The module must be supported along the length of the long edge, and should overlap the array rail by at least 20mm. Note that the mounting clips should meet the minimum dimensions (catch width of 5mm and length of 30mm) as shown in Figure 4. We recommend that the array rails shall support the bottom of the modules and shall be continuous pieces (no breaks in the rail) and this may be decided by the installer according to the roof structure.

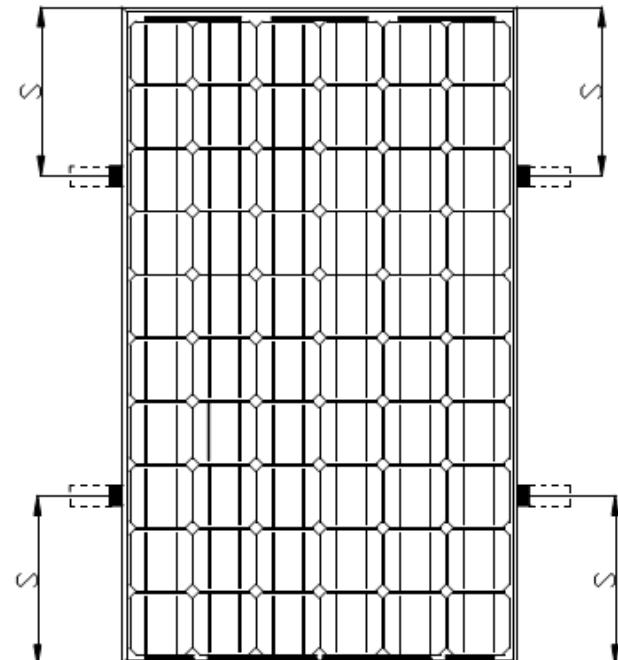


Figures 4



$$140\text{mm} < e < 390\text{mm}$$

Figures 5



$$140\text{mm} < s < 390\text{mm}$$

Figures 6

## **Mounting Using Clips on Long Edge of Module: Long Edge Perpendicular to Array Rails (Figure 6)**

The modules may also be mounted using clips on the long sides of the module when the array rails are perpendicular to the long sides, as shown in Figure 6. The clip centerlines must be between 140mm and 390mm from the ends of the module. Note that the mounting clips should meet the minimum dimensions (catch width of 5mm and length of 30mm) shown in Figure 4. The array rails must support the bottom of the modules and must be continuous pieces (no breaks in the rail).



## 2. ELECTRICAL INSTALLATION INSTRUCTION

### Cable characteristics

Size: 4.0mm<sup>2</sup>

Type: TUV cable

Temperature rating of conductor: -40~120°C

### Module configuration (Recommend)

# Maximum series configuration: please refer to Table 1 (This value is calculated under the condition of Voc at -40°C.)

# Maximum parallel strings without proper measures (e.g. fuse and/or blocking diode): 1 string.

(Note: Parallel configuration is not limited in case of taking proper measure (e.g. fuse for protection of module and cable from over current, and/or blocking diode for prevention of unbalanced strings voltage) to block the reverse current flow.)

## 3. WARNING

**Do not stand or step on the PV module (Glass, Frame, Film and Terminal box).**

## INSTALLATION MANUAL - PHOTOVOLTAIC MODULES-

### ELECTRICAL OUTPUT AND THERMAL CHARACTERISTIC

Rated electrical characteristics are within  $\pm 10$  percent of the indicated values of Isc, Voc, and  $\pm 3$  percent of Pmax under STC (standard test conditions) (irradiance of 1000 W/m<sup>2</sup>, AM 1.5 spectrum, and a cell temperature of 25 °C (77°F). The warranty conditions are specified elsewhere in this manual.

Table-1. Electrical characteristics (at STC)

Model Type	Maximum Power (Pmax)	Tolerance	Open Circuit Voltage (Voc)	Short circuit current (Isc)	Maximum Power voltage (Vmp)	Maximum Power Current (Imp)	Maximum system Voltage	Fuse Current	Application Class	Maximum Series Configuration
EG-195P60-C	195W	$\pm 3\%$	36.46V	7.67A	28.79V	6.8A	1000V	13A	A	44.16V
EG-200P60-C	200W	$\pm 3\%$	36.52V	7.81A	28.67V	6.97A	1000V	13A	A	44.23V
EG-205P60-C	205W	$\pm 3\%$	36.58V	7.97A	28.55V	7.2A	1000V	13A	A	44.31V
EG-210P60-C	210W	$\pm 3\%$	36.61V	8.04A	28.41V	7.39A	1000V	13A	A	44.34V
EG-215P60-C	215W	$\pm 3\%$	36.67V	8.26A	28.28V	7.6A	1000V	13A	A	44.42V
EG-220P60-C	220W	$\pm 3\%$	36.69V	8.48A	28.22V	7.8A	1000V	13A	A	44.44V
EG-225P60-C	225W	$\pm 3\%$	36.74V	8.68A	28.18V	7.99A	1000V	13A	A	44.50V
EG-230P60-C	230W	$\pm 3\%$	36.76V	8.9A	28.22V	8.15A	1000V	13A	A	44.53V
EG-200M60-C	200W	$\pm 3\%$	36.52V	7.81A	28.67V	6.97A	1000V	13A	A	44.23V
EG-205M60-C	205W	$\pm 3\%$	36.58V	7.97A	28.55V	7.2A	1000V	13A	A	44.31V
EG-210M60-C	210W	$\pm 3\%$	36.61V	8.04A	28.41V	7.39A	1000V	13A	A	44.34V
EG-215M60-C	215W	$\pm 3\%$	36.67V	8.26A	28.28V	7.6A	1000V	13A	A	44.42V
EG-220M60-C	220W	$\pm 3\%$	36.69V	8.48A	28.22V	7.8A	1000V	13A	A	44.44V
EG-225M60-C	225W	$\pm 3\%$	36.74V	8.68A	28.18V	7.99A	1000V	13A	A	44.50V
EG-230M60-C	230W	$\pm 3\%$	36.76V	8.9A	28.22V	8.15A	1000V	13A	A	44.53V
EG-235M-60-C	235W	$\pm 3\%$	36.76V	9.01A	28.22V	8.33A	1000V	13A	A	44.53V

Under normal conditions, a photovoltaic module is likely to experience conditions that produce more current and/or voltage than reported at Standard Test Conditions. Accordingly, the values of Isc and Voc marked on this module should be multiplied by a factor of 1.25 when determining component voltage ratings, conductor capacities, fuse sizes and size of controls connected to the module output.

## INSTALLATION MANUAL - PHOTOVOLTAIC MODULES-

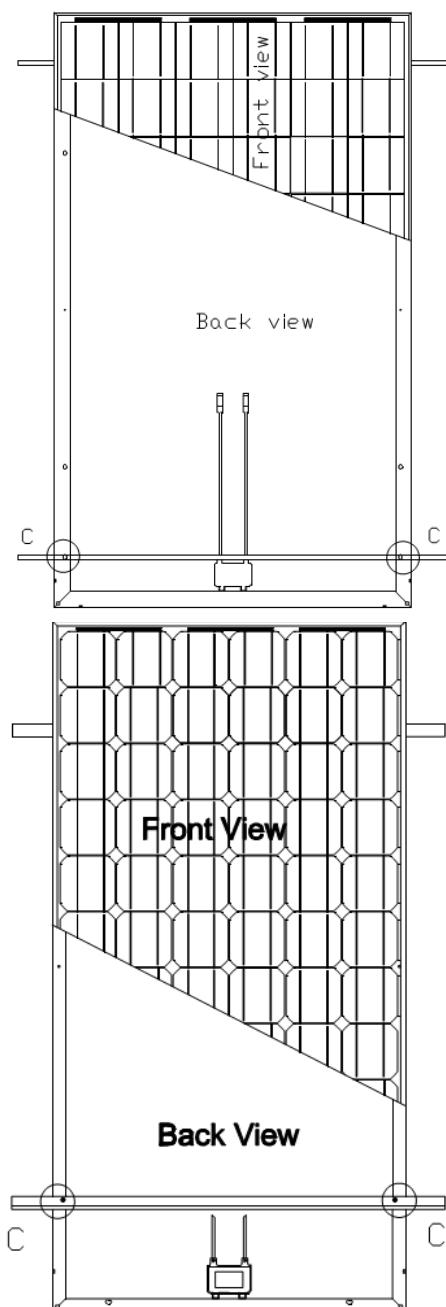
### EG-285SM EG-72SP

#### 1. INSTALLATION

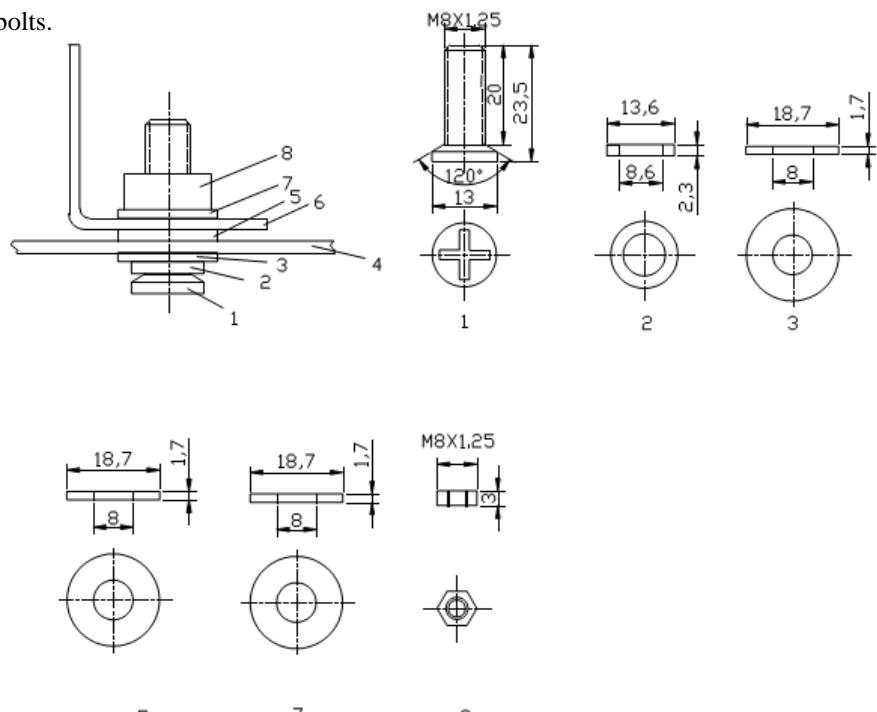
The mounting method has been verified by EGING and NOT CERTIFIED by a third party organization. Please review the descriptions and drawings carefully; not mounting the modules according to one of these methods may void your warranty. These mounting methods are designed to allow module loading of 5400Pa.

#### Mounting Using Frame Bolt Holes (Figures 1 , 2 & 3)

The modules may be fastened to a support using the bolt holes in the bottom of the frame at location "C", as shown in Figure 1 (back view of the module) , Figure 2 (mounting detail) and Figure 3 (parts detail). The module should be fastened with four (4) M8 bolts.



**Figures 1**



**Note: Installation Order 1 to 8**

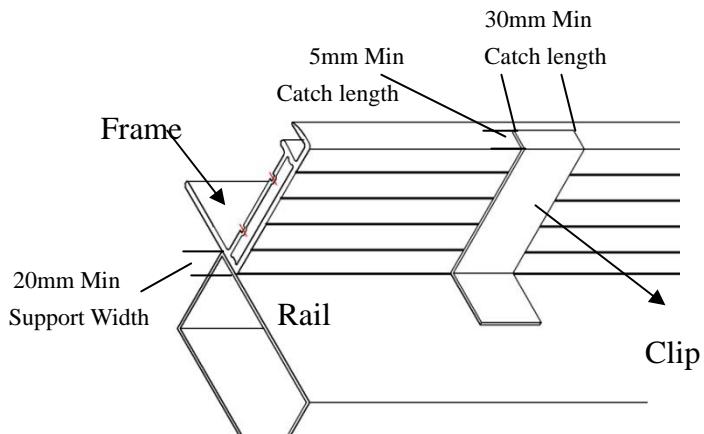
**Figures 2**

8	Nut	M8X1.25
7	Gasket	18.7X1.7
6	Mount	5X40
5	Gasket	18.7X1.7
4	Frame of the module	1968X990X50
3	Gasket	18.7X1.7
2	Spring gasket	13.6X2.3
1	Screw	M8X1.25
No.	NAME	standard

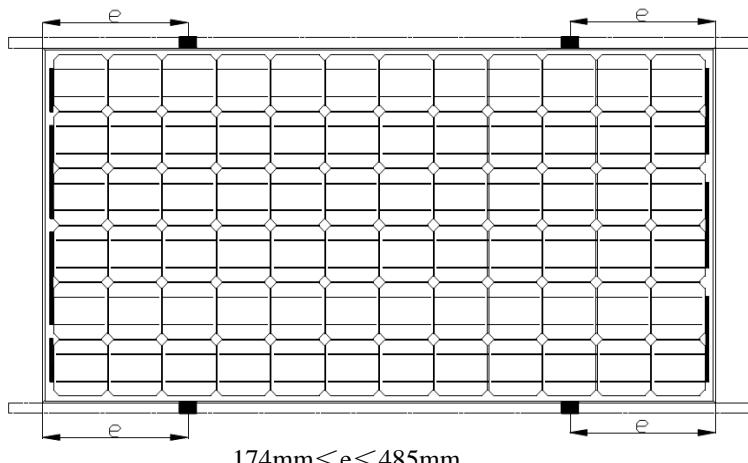
**Figures 3**

### **Mounting Using Clips on Long Edge of Module: Long Edge Parallel to Array Rails (Figure 5)**

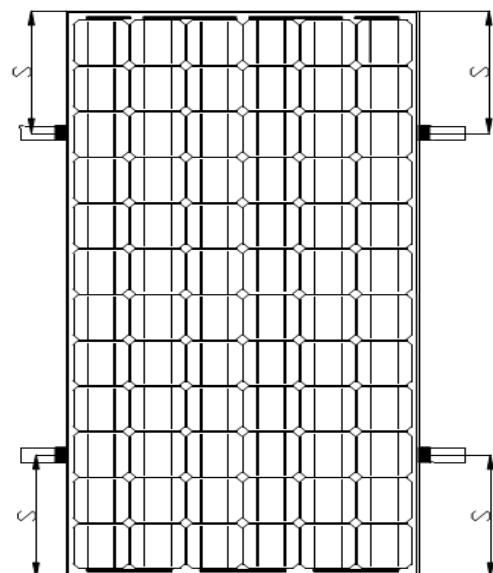
The modules may be mounted using clips (clamps) designed for solar modules as shown in Figures 4 and 5. Note that the clip positions are important – the clip centerlines must be between 174mm and 485mm from the end of the module. The module must be supported along the length of the long edge, and should overlap the array rail by at least 20mm. Note that the mounting clips should meet the minimum dimensions (catch width of 5mm and length of 30mm) as shown in Figure 4. We recommend that the array rails shall support the bottom of the modules and shall be continuous pieces (no breaks in the rail) and this may be decided by the installer according to the roof structure.



Figures 4



Figures 5



Figures 6

### **Mounting Using Clips on Long Edge of Module: Long Edge Perpendicular to Array Rails (Figure 6)**

The modules may also be mounted using clips on the long sides of the module when the array rails are perpendicular to the long sides, as shown in Figure 6. The clip centerlines must be between 174mm and 485mm from the ends of the module. Note that the mounting clips should meet the minimum dimensions (catch width of 5mm and length of 30mm) shown in Figure 4. The array rails must support the bottom of the modules and must be continuous pieces (no breaks in the rail).

## **2. ELECTRICAL INSTALLATION INSTRUCTION**

### **Cable characteristics**

Size: 4.0mm<sup>2</sup>

Type: TUV cable

Temperature rating of conductor: -40~120°C

### Module configuration (Recommend)

# Maximum series configuration: please refer to Table 1 (This value is calculated under the condition of Voc at -40°C.)

# Maximum parallel strings without proper measures (e.g. fuse and/or blocking diode): 1 string.

(Note: Parallel configuration is not limited in case of taking proper measure (e.g. fuse for protection of module and cable from over current, and/or blocking diode for prevention of unbalanced strings voltage) to block the reverse current flow.)

### 3. WARNING

**Do not stand or step on the PV module (Glass, Frame, Film and Terminal box).**

## INSTALLATION MANUAL - PHOTOVOLTAIC MODULES-

### ELECTRICAL OUTPUT AND THERMAL CHARACTERISTIC

Rated electrical characteristics are within  $\pm 10$  percent of the indicated values of Isc, Voc, and  $\pm 3$  percent of Pmax under STC (standard test conditions) (irradiance of 1000 W/m<sup>2</sup>, AM 1.5 spectrum, and a cell temperature of 25 °C (77°F). The warranty conditions are specified elsewhere in this manual.

Table-1. Electrical characteristics (at STC)

Model Type	Maximum Power (Pmax)	Tolerance	Open Circuit Voltage (Voc)	Short circuit current (Isc)	Maximum Power voltage (Vmp)	Maximum Power Current (Imp)	Maximum system Voltage	Fuse Current	Application Class	Maximum Series Configuration
EG-235P72-C	235W	$\pm 3\%$	43.2V	7.66A	34.2V	6.87A	1000V	13A	A	52.33V
EG-240P72-C	240W	$\pm 3\%$	43.2V	7.83A	34.2V	7.02A	1000V	13A	A	52.33V
EG-245P72-C	245W	$\pm 3\%$	43.5V	7.93A	34.5V	7.1A	1000V	13A	A	52.69V
EG-250P72-C	250W	$\pm 3\%$	43.5V	8.1A	34.5V	7.25A	1000V	13A	A	52.69V
EG-255P72-C	255W	$\pm 3\%$	43.5V	8.37A	34.5V	7.39A	1000V	13A	A	52.69V
EG-260P72-C	260W	$\pm 3\%$	43.8V	8.47A	34.8V	7.47A	1000V	13A	A	53.05V
EG-265P72-C	265W	$\pm 3\%$	43.8V	8.52A	34.8V	7.61A	1000V	13A	A	53.05V
EG-270P72-C	270W	$\pm 3\%$	44.1V	8.62A	35.1V	7.69A	1000V	13A	A	53.42V
EG-275P72-C	275W	$\pm 3\%$	44.4V	8.72A	35.42V	7.76A	1000V	13A	A	53.78V
EG-280P72-C	280W	$\pm 3\%$	44.4V	8.89A	35.42V	7.91A	1000V	13A	A	53.78V
EG-240M72-C	240W	$\pm 3\%$	43.2V	7.83A	34.2V	7.02A	1000V	13A	A	52.33V
EG-245M72-C	245W	$\pm 3\%$	43.5V	7.93A	34.5V	7.1A	1000V	13A	A	52.69V
EG-250M72-C	250W	$\pm 3\%$	43.5V	8.1A	34.5V	7.25A	1000V	13A	A	52.69V
EG-255M72-C	255W	$\pm 3\%$	43.5V	8.37A	34.5V	7.39A	1000V	13A	A	52.69V
EG-260M72-C	260W	$\pm 3\%$	43.8V	8.47A	34.8V	7.47A	1000V	13A	A	53.05V
EG-265M72-C	265W	$\pm 3\%$	43.8V	8.52A	34.8V	7.61A	1000V	13A	A	53.05V
EG-270M72-C	270W	$\pm 3\%$	44.1V	8.62A	35.1V	7.69A	1000V	13A	A	53.42V
EG-275M72-C	275W	$\pm 3\%$	44.4V	8.72A	35.42V	7.76A	1000V	13A	A	53.78V
EG-280M72-C	280W	$\pm 3\%$	44.4V	8.89A	35.42V	7.91A	1000V	13A	A	53.78V
EG-285M72-C	285W	$\pm 3\%$	44.4V	8.92A	35.42V	8.05A	1000V	13A	A	53.78V

Under normal conditions, a photovoltaic module is likely to experience conditions that produce more current and/or voltage than reported at Standard Test Conditions. Accordingly, the values of Isc and Voc marked on this module should be multiplied by a factor of 1.25 when determining component voltage ratings, conductor capacities, fuse sizes and size of controls connected to the module output.

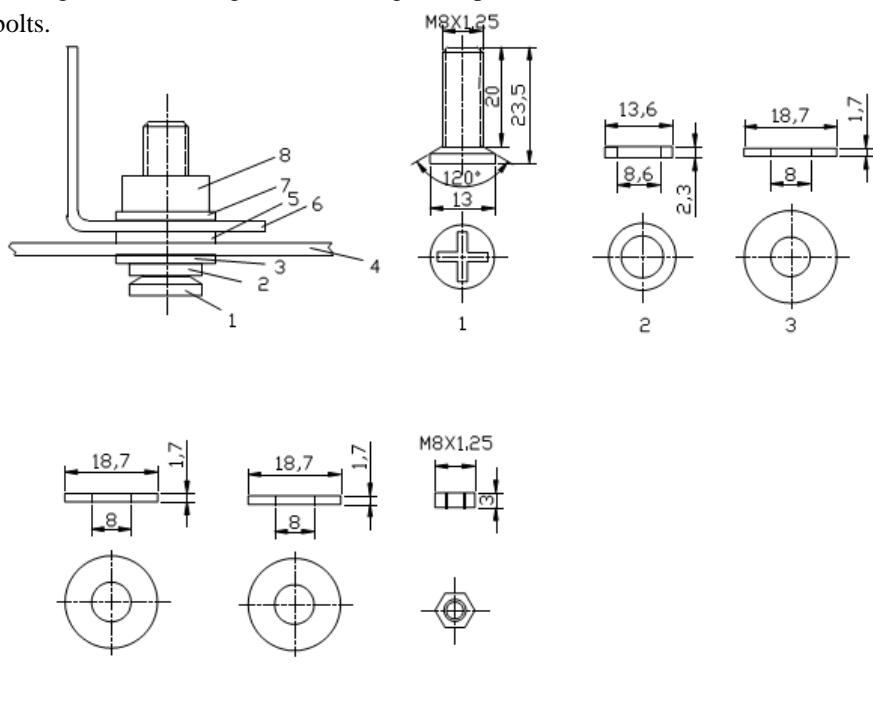
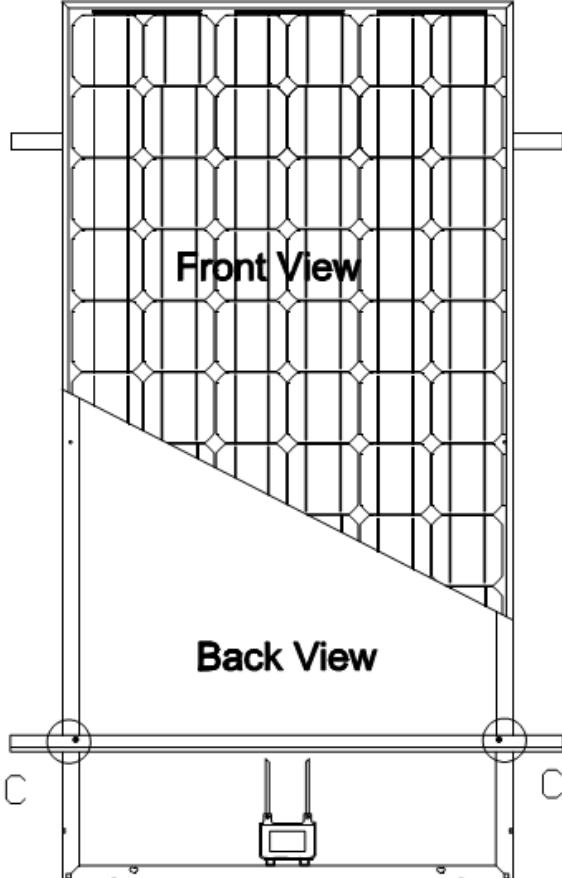
## INSTALLATION MANUAL - PHOTOVOLTAIC MODULES- EG-220SM

### 1. INSTALLATION

The mounting method has been verified by EGING and NOT CERTIFIED by a third party organization. Please review the descriptions and drawings carefully; not mounting the modules according to one of these methods may void your warranty. These mounting methods are designed to allow module loading of 5400Pa.

#### Mounting Using Frame Bolt Holes (Figures 1 , 2 & 3)

The modules may be fastened to a support using the bolt holes in the bottom of the frame at location "C", as shown in Figure 1 (back view of the module) , Figure 2 (mounting detail) and Figure 3 (parts detail). The module should be fastened with four (4) M8 bolts.

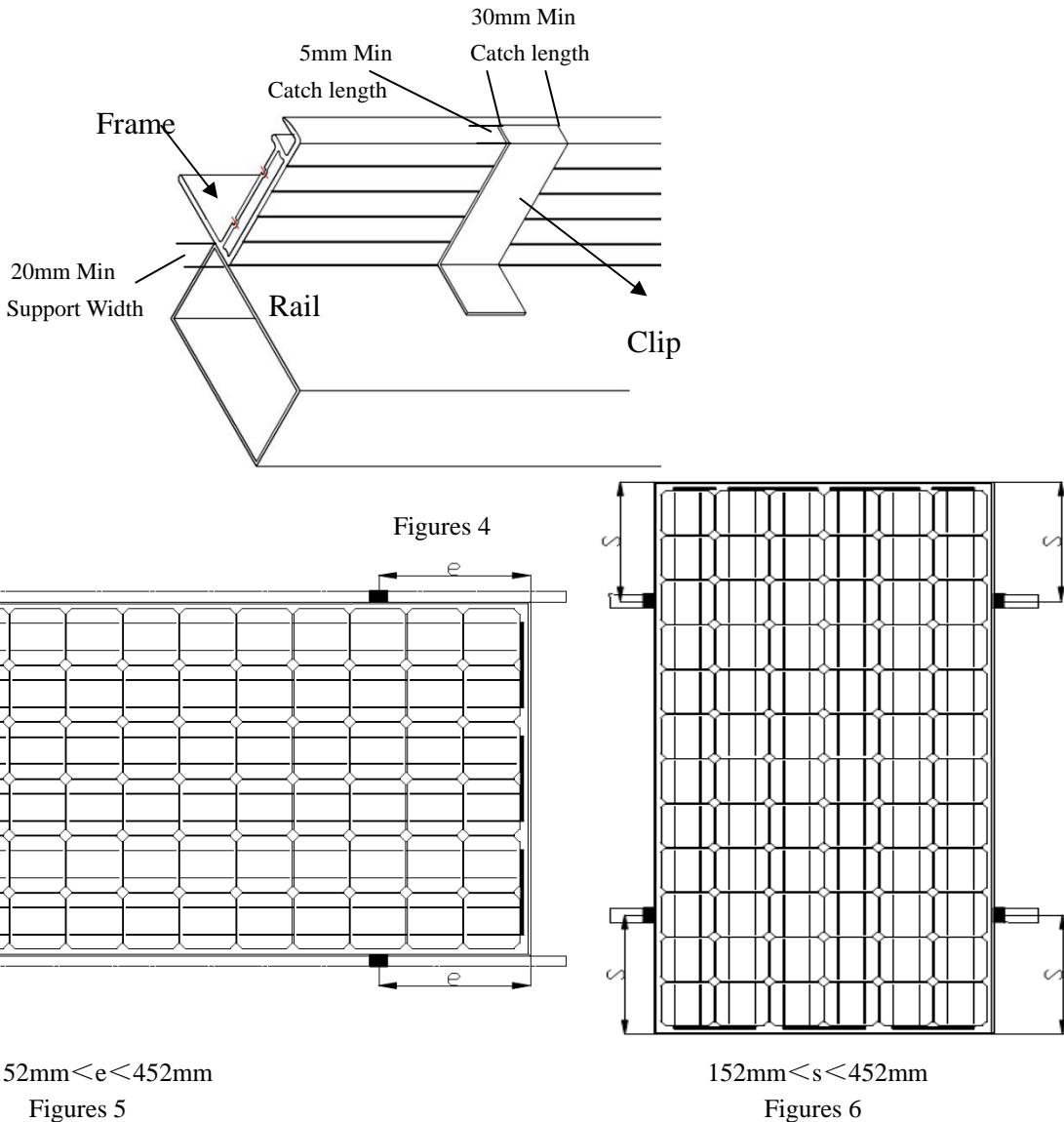


8	Nut	M8X1.25
7	Gasket	18.7X1.7
6	Mount	5X40
5	Gasket	18.7X1.7
4	Frame of the module	1704X870X50
3	Gasket	18.7X1.7
2	Spring gasket	13.6X2.3
1	Screw	M8X1.25
No.	NAME	standard

**Figures 3**

### **Mounting Using Clips on Long Edge of Module: Long Edge Parallel to Array Rails (Figure 5)**

The modules may be mounted using clips (clamps) designed for solar modules as shown in Figures 4 and 5. Note that the clip positions are important – the clip centerlines must be between 152mm and 452mm from the end of the module. The module must be supported along the length of the long edge, and should overlap the array rail by at least 20mm. Note that the mounting clips should meet the minimum dimensions (catch width of 5mm and length of 30mm) as shown in Figure 4. We recommend that the array rails shall support the bottom of the modules and shall be continuous pieces (no breaks in the rail) and this may be decided by the installer according to the roof structure.



### **Mounting Using Clips on Long Edge of Module: Long Edge Perpendicular to Array Rails (Figure 6)**

The modules may also be mounted using clips on the long sides of the module when the array rails are perpendicular to the long sides, as shown in Figure 6. The clip centerlines must be between 152mm and 452mm from the ends of the module. Note that the mounting clips should meet the minimum dimensions (catch width of 5mm and length of 30mm) shown in Figure 4. The array rails must support the bottom of the modules and must be continuous pieces (no breaks in the rail).



## 2. ELECTRICAL INSTALLATION INSTRUCTION

### Cable characteristics

Size: 4.0mm<sup>2</sup>

Type: TUV cable

Temperature rating of conductor: -40~120°C

### Module configuration (Recommend)

# Maximum series configuration: please refer to Table 1 (This value is calculated under the condition of Voc at -40°C.)

# Maximum parallel strings without proper measures (e.g. fuse and/or blocking diode): 1 string.

(Note: Parallel configuration is not limited in case of taking proper measure (e.g. fuse for protection of module and cable from over current, and/or blocking diode for prevention of unbalanced strings voltage) to block the reverse current flow.)

## 3. WARNING

**Do not stand or step on the PV module (Glass, Frame, Film and Terminal box).**

## INSTALLATION MANUAL - PHOTOVOLTAIC MODULES-

### ELECTRICAL OUTPUT AND THERMAL CHARACTERISTIC

Rated electrical characteristics are within ±10 percent of the indicated values of Isc, Voc, and ±3 percent of Pmax under STC (standard test conditions) (irradiance of 1000 W/m<sup>2</sup>, AM 1.5 spectrum, and a cell temperature of 25 °C (77°F). The warranty conditions are specified elsewhere in this manual.

Table-1. Electrical characteristics (at STC)

Model Type	Maximum Power (Pmax)	Tolerance	Open Circuit Voltage (Voc)	Short circuit current (Isc)	Maximum Power voltage (Vm)	Maximum Power Current (Imp)	Maximum system Voltage	Fuse Current	Application Class	Maximum Series Configuration
EG-190M72-B	190W	±3%	43.82V	6.01A	34.93V	5.44A	1000V	11A	A	53.08V
EG-195M72-B	195W	±3%	43.88V	6.16A	34.91V	5.59A	1000V	11A	A	53.15V
EG-200M72-B	200W	±3%	43.91V	6.34A	34.81V	5.74A	1000V	11A	A	53.19V
EG-205M72-B	205W	±3%	43.99V	6.46A	34.81V	5.89A	1000V	11A	A	53.28V
EG-210M72-B	210W	±3%	44.03V	6.63A	34.74V	6.04A	1000V	11A	A	53.33V

Under normal conditions, a photovoltaic module is likely to experience conditions that produce more current and/or voltage than reported at Standard Test Conditions. Accordingly, the values of Isc and Voc marked on this module should be multiplied by a factor of 1.25 when determining component voltage ratings, conductor capacities, fuse sizes and size of controls connected to the module output.

**Changzhou EGing Photovoltaic Technology Co., Ltd.**

No. 18 Jinwu Road, Jintan, Jiangsu, China

TEL: +86 519 82588999 FAX: +86 519 82588999

Website: [www.egingpv.com](http://www.egingpv.com)